

# It's a Dry Heat: Quantifying Effects of Increasing Atmospheric Moisture Demand on Native Oklahoma Trees

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## Introduction

- Vapor Pressure Deficit (VPD) is the atmospheric demand for water and increases nonlinearly with temperature
- Increases in VPD are expected across the world presenting a new challenge for tree survival due to increased water stress
- Using six Oklahoma tree species we set out to develop a methodology and conceptual framework to better understand how trees respond to VPD

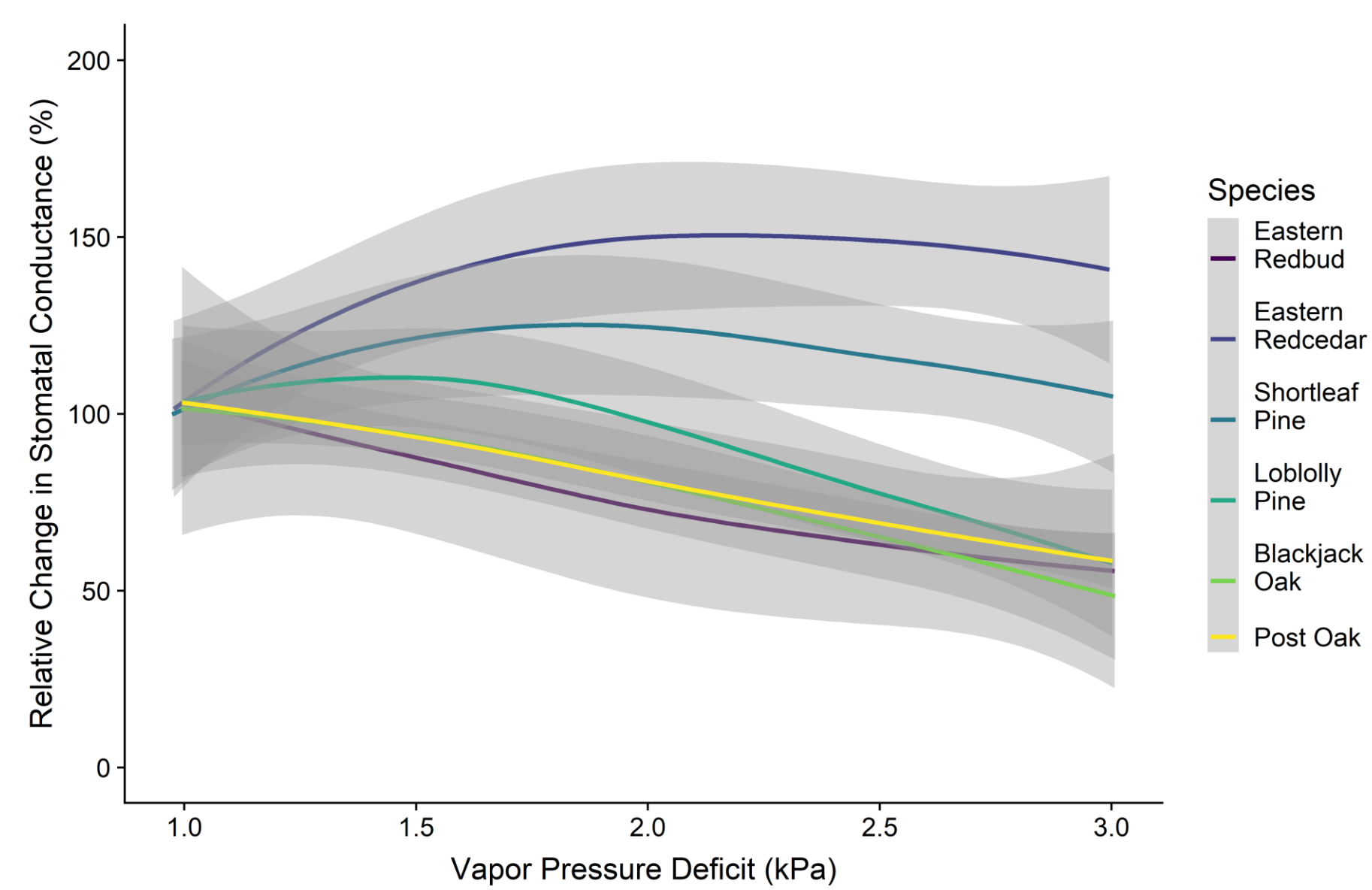
## Methods

- Six species (n=5-6 per species) were selected representing a variety of habitats and life traits
- Measured gas exchange with LI-6800 at 25°C, saturating light levels, and 400ppm CO<sub>2</sub>
- 30 minutes at each VPD before measurement

VPD at leaf (kPa)	Relative Humidity at 25°C
1.0	75.5%
1.5	58.9%
2.0	43.3%
2.5	27.7%
3.0	12.2%

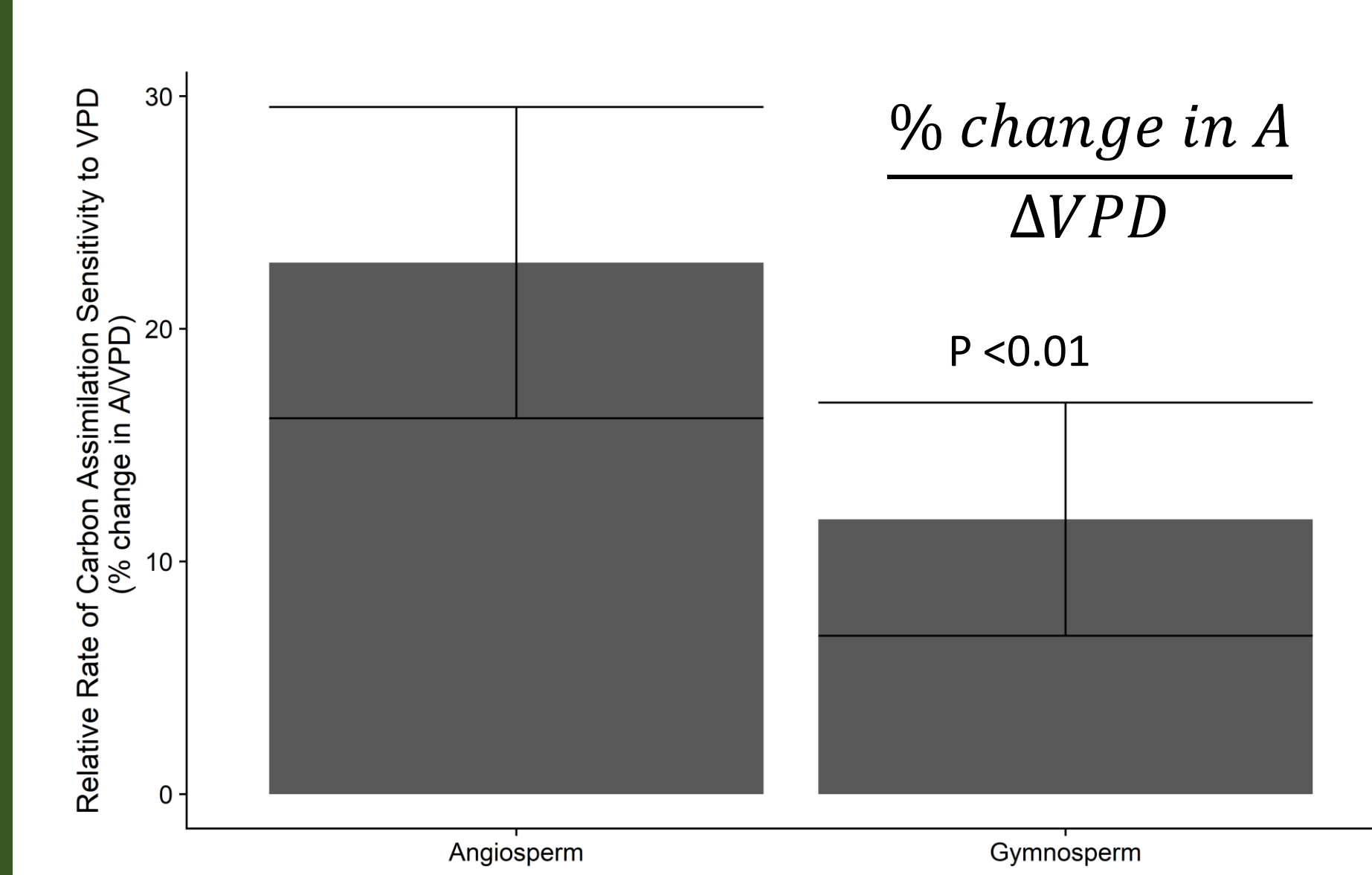
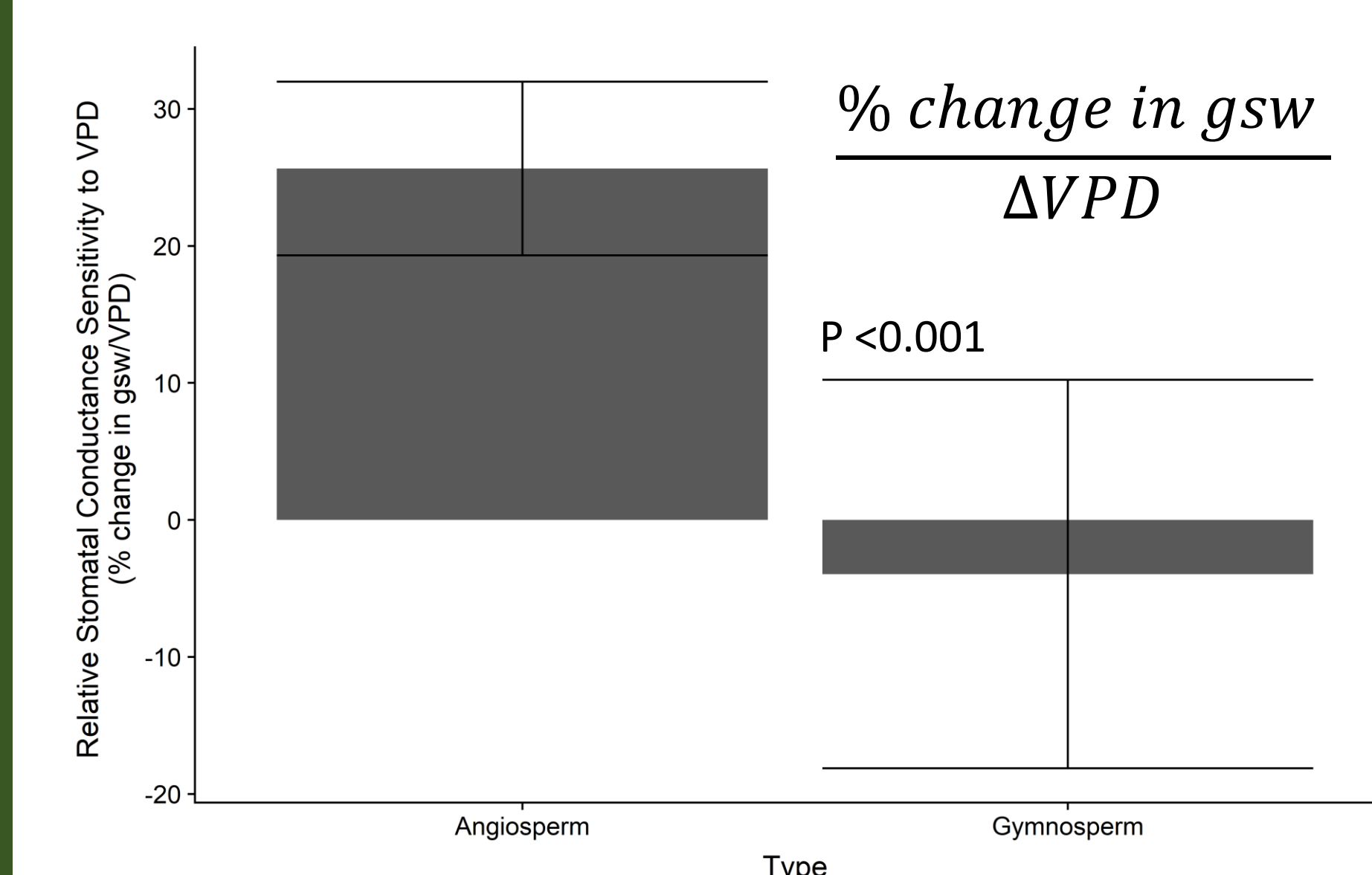
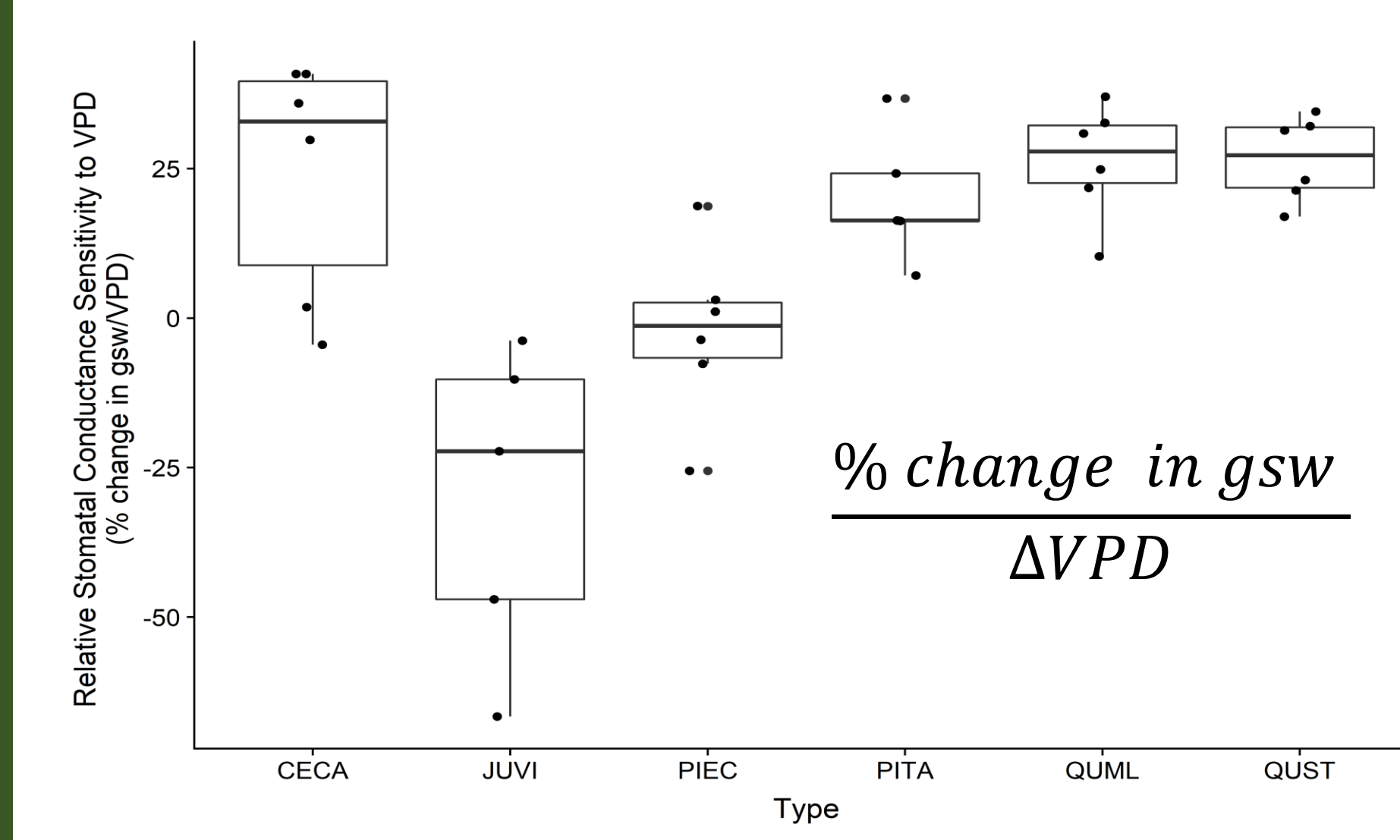
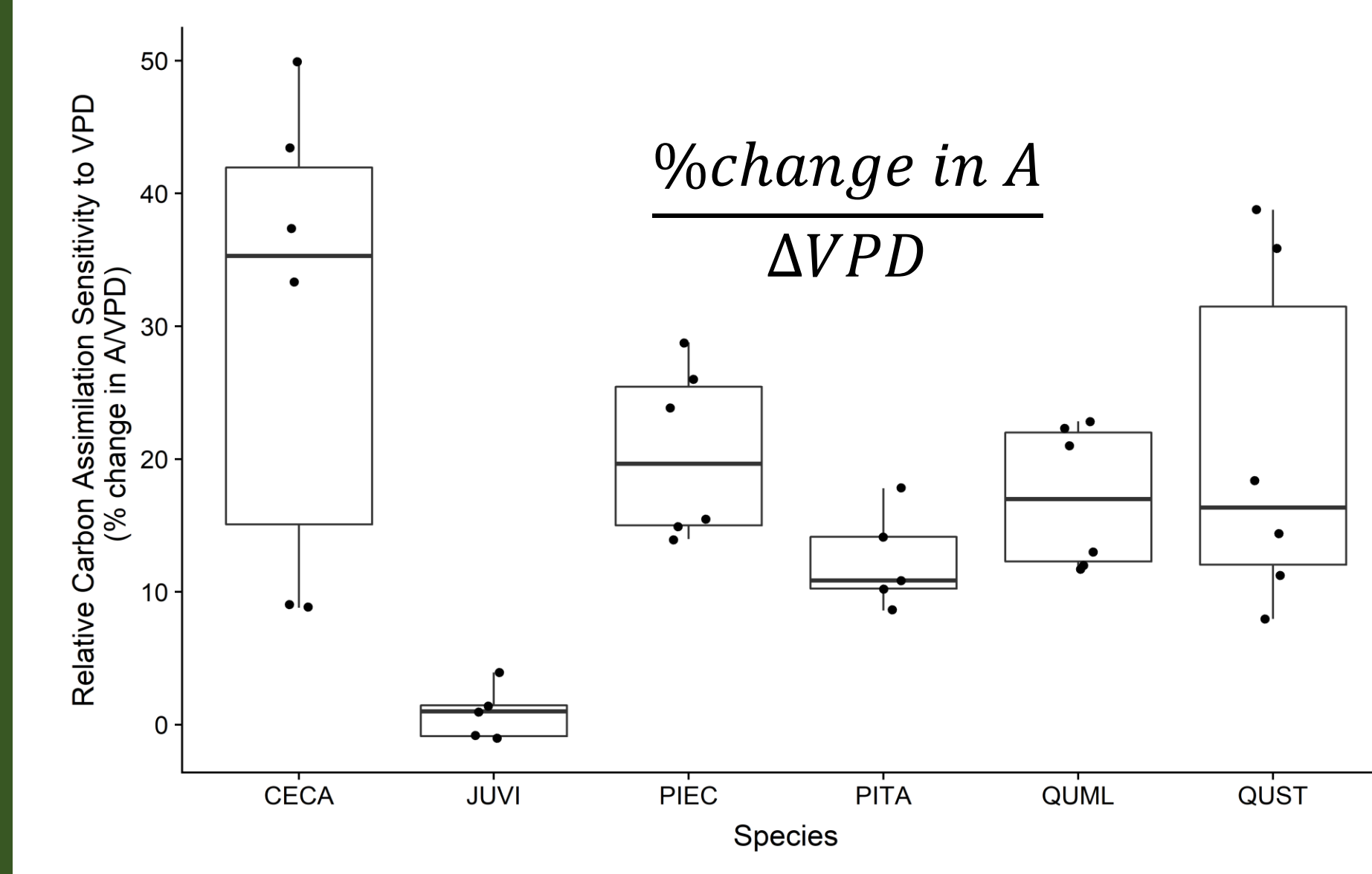
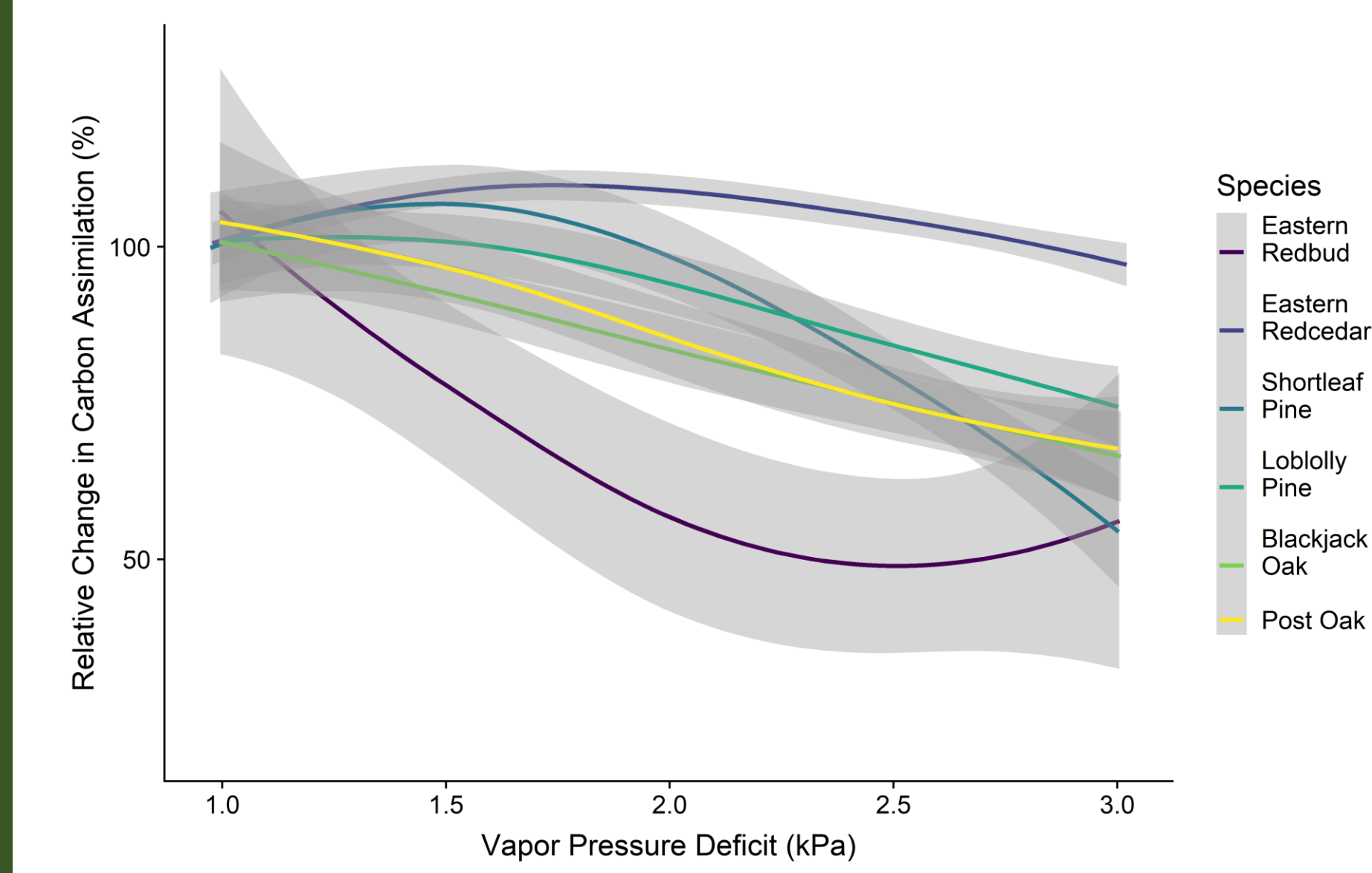
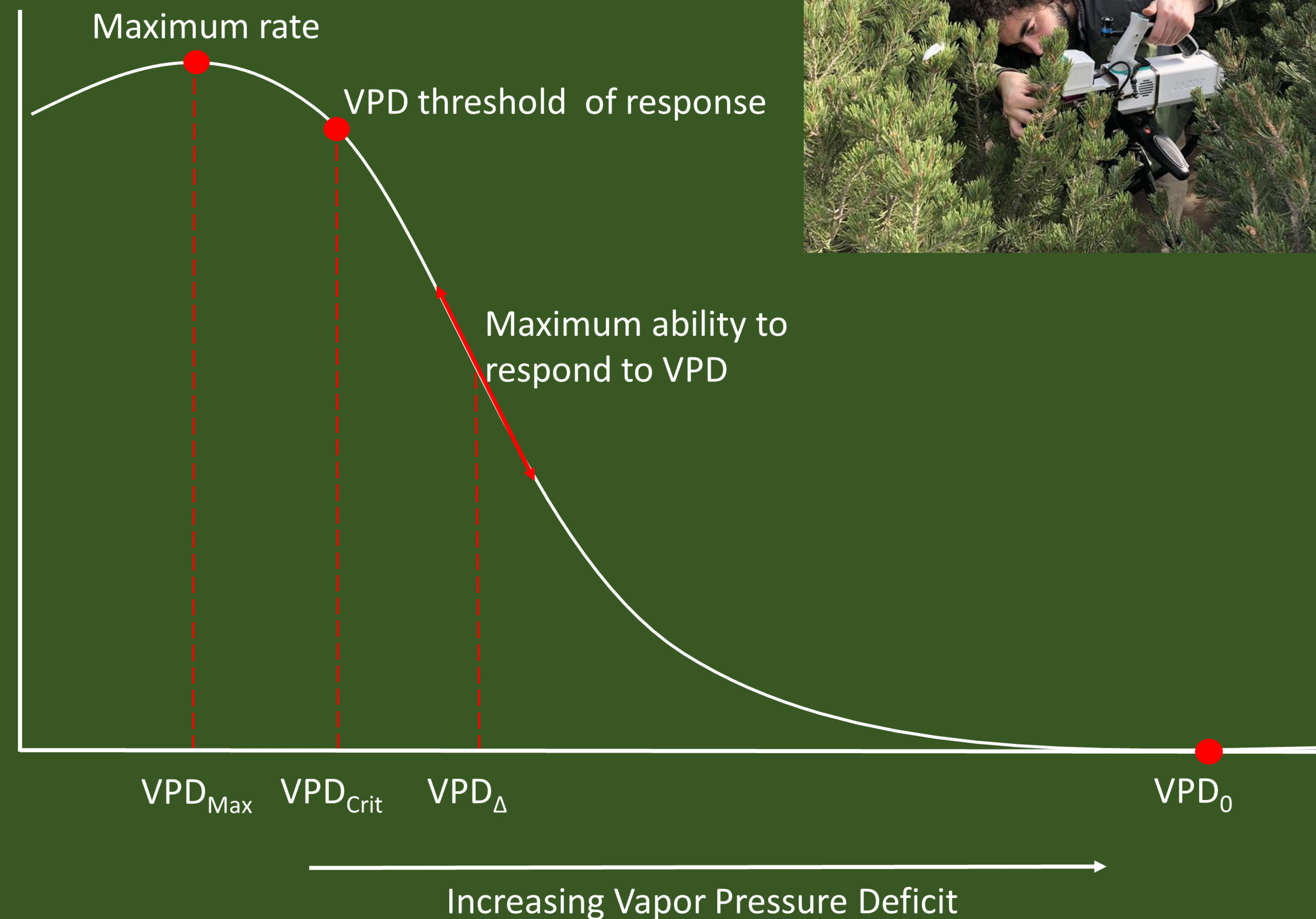
## Results and Discussion

- Angiosperms are more sensitive than gymnosperms to changes in VPD at the leaf level, possibly due to leaf anatomy
- Our conceptual framework and methodology can be applied across taxa to better understand how plants respond to their environment and better inform models.
- Improved quantification of how VPD affects photosynthesis is needed for climate-vegetation models



# Determining the response of photosynthetic performance to vapor pressure deficit between species requires methods standardization.

Rate of Carbon Assimilation or Stomatal Conductance



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Conceptual diagram we designed to test the relationship between photosynthetic response and increasing vapor pressure deficit with the points that are necessary to characterize and compare species.